UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER OF PATENTS AND TRADEMARKS
Washington, D.C. 20231
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/747,731	12/22/2000	Shunpei Yamazaki	SEL 233	4617

7590 12/19/2002

COOK, ALEX, McFARRON, MANZO
CUMMINGS & MEHLER, LTD.
Suite 2850
200 West Adams Street
Chicago, IL 60606

EXAMINER
FLETCHER III, WILLIAM P

ART UNIT	PAPER NUMBER
1762	

DATE MAILED: 12/19/2002

9

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)
	09/747,731	YAMAZAKI ET AL.
	Examiner	Art Unit
	William P. Fletcher III	1762

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *30 September 2002* .

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *20-53* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *20-53* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☒ The proposed drawing correction filed on *30 September 2002* is: a)☒ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other:

DETAILED OFFICE ACTION

Note: Those sections of Title 35, United States Code, not cited in this action may be found in Paper No. 4.

I. Receipt of Response

Response is acknowledged of applicant's response, timely-filed on 30 September 2002 and made of record as Paper No. 6.

II. Response to Amendment

Applicant's amendment in Paper No. 6 has changed the title, amended the specification and claim 20, cancelled claims 1 - 19, and added new claims 21 - 53. To clarify the record at this point in the prosecution, claims 20 - 53 are pending.

III. Response to Arguments

Applicant's arguments in Paper No. 6 have been fully considered. The examiner's response(s) is/are set-forth below.

Applicant has perfected their priority in Paper No. 8. Takacs et al. {US 6,244,212 B1} is, therefore, not prior art. The rejection of claim 20 based on this reference is withdrawn below.

Applicant has correctly argued that the rejection of claim 20 over Mizutani et al., Bennett, Grothe et al., Barshter, and Namiki does not meet the limitations of this claim as-amended. This rejection is also withdrawn below.

IV. Form & Content of Application

Title

The objection under this section in Paper No. 4 is withdrawn.

Drawings

The proposed drawing correction and/or the proposed substitute sheets of drawings, filed with Paper No. 5, have been approved. A proper drawing correction or corrected drawings are required in reply to this Office action to avoid abandonment of the application. The correction to the drawings will not be held in abeyance.

The Patent and Trademark Office no longer makes drawing changes. See 1017 O.G. 4. It is applicant's responsibility to ensure that the drawings are corrected. Corrections must be made in accordance with the instructions below.

INFORMATION ON HOW TO EFFECT DRAWING CHANGES

1. Correction of Informalities -- 37 CFR 1.85

New corrected drawings must be filed with the changes incorporated therein. Identifying indicia, if provided, should include the title of the invention, inventor's name, and application number, or docket number (if any) if an application number has not been assigned to the application. If this information is provided, it must be placed on the front of each sheet and centered within the top margin. If corrected drawings are required in a Notice of Allowability (PTOL-37), the new drawings **MUST** be filed within the **THREE MONTH** shortened statutory period set for reply in the "Notice of Allowability." Extensions of time may NOT be obtained under the provisions of 37 CFR 1.136 for filing the corrected drawings after the mailing of a Notice of Allowability. The drawings should be filed as a separate paper with a transmittal letter addressed to the Official Draftsperson.

2. Corrections other than Informalities Noted by Draftsperson on form PTO-948.

All changes to the drawings, other than informalities noted by the Draftsperson, **MUST** be made in the same manner as above except that, normally, a highlighted (preferably red ink) sketch of the changes to be incorporated into the new drawings **MUST** be approved by the examiner before the application will be allowed. No changes will be permitted to be made, other than correction of informalities, unless the examiner has approved the proposed changes.

3. Timing of Corrections

Applicant is required to submit acceptable corrected drawings within the time period set in the Office action. See 37 CFR 1.185(a). Failure to take corrective action within the set (or extended) period will result in **ABANDONMENT** of the application.

V. Rejections under 35 U.S.C. § 112, 2nd Paragraph

The rejection of claim 20 under this section in Paper No. 4 is withdrawn.

(1) Claims 20 - 53 are rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

All of the pending independent claims recite that the evaporation source(s) has/have "an elongated shape." This phrase renders the claims indefinite. The adjective "elongated" is defined as "stretched out" or "slender" [*Merriam-Webster's Collegiate Dictionary, 10th Ed.*, p. 375]. The fashion and degree to which the evaporation source is "stretched out" is unclear. Further, "slender" is a relative term and, since the term is not defined by the claim and the specification does not provide a standard for ascertaining the requisite degree, one of ordinary

skill in the art would not be reasonably apprised of the scope of the invention.

The term "active matrix type" EL display device is indefinite. It is unclear what the metes and bounds indicated by "type" are and, consequently, one of ordinary skill in the art would not be reasonably apprised of the scope of the invention.

VI. Rejections under 35 U.S.C. § 103

(2) Claims 20 - 22, 44, 45, and 48 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Arai et al. {US 5,817,366} in view of Grothe et al. {US 3,391,490} and Monk {US 4,187,801}.

With respect to claim 20, Arai et al. teach a method of manufacturing a display device in a cluster tool [abstract; c. 2, ll. 31 - 35; and c. 3, ll. 10 - 15]. Each processing chamber, of which there are at least two, has an evaporation source for the deposition of a material on the substrate [c. 3, l. 66 - c. 4, l. 6]. As the substrate is transferred between chambers, layers of different materials are successively applied to produce the display device [c. 4, ll. 34 - 51 and c. 9, ll. 1

- 20]. Arai et al. do not place any limitations on the vapor deposition processes carried-out in the chambers.

Arai et al. do not teach that first and second evaporation sources have an elongated shape or that the relative positions of the sources and the substrate are moved during deposition.

Grothe et al. teach that, when coating a substrate by vapor deposition, an evaporation source elongated in one dimension results in enhanced vapor density and deposition uniformity over the entire width of the substrate [c. 5, ll. 40 - 50 and 60 - 63]. It is the examiner's position that the source of Grothe et al. reads on a source having "an elongated shape."

It would have been obvious to one of ordinary skill in the art to modify the process of Arai et al., so as to utilize an evaporation source elongated in one dimension, as suggested by Grothe et al. One of ordinary skill in the art would have been motivated to do so by the desire and expectation of achieving enhanced vapor density and deposition uniformity, as suggested by Grothe et al.

Monk teaches that, in a process where a substrate is coated from an evaporation source, it is known to move the substrate and the evaporation source relative to each other [c. 1, ll. 9 - 21]. Doing so yields a uniform coating [c. 1, l. 15].

It would have been obvious to one of ordinary skill in the art to further modify the process of Arai et al. so as to move the substrate and the evaporation source relative to each other, as suggested by Monk. One of ordinary skill in the art would have been motivated to do so by the desire and expectation of yielding a uniform coating.

If applicant's first direction is interpreted as being the same as the second direction, no further explanation is necessary. If, in the alternative, the first direction is not the same as the second, it would have been obvious to one of ordinary skill in the art to optimize the orientation of the source with respect to the direction of motion so as to achieve the greatest efficiency and uniformity of coating. In particular, an orientation in which the direction of elongation of the source is perpendicular to the direction of motion allows coating the widest swath of substrate possible with each pass of the coating source.

With respect to claims 21, none of the cited references teach cleaning the inside of the deposition chambers. It is the examiner's position, however, that cleaning the inside of a deposition chamber is a well-known means of eliminating

contaminants in the chamber. Consequently, it would have been obvious to one of ordinary skill in the art to do so.

With respect to claim 22, the transfer vacuum chamber **1** of Arai et al. reads on a "conveyor chamber."

(3) Claims 23, 25, 29, 33, 34, 43, 46, 47, and 50 - 52 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Mizutani et al. {US 6,326,726 B1}, in view of Grothe et al. {US 3,391,490} and Bennett {US 2,435,997}.

Mizutani et al. teach a method for the manufacture of an electroluminescent display device [c. 1, ll. 6 - 10]. The various layers of the device, including the organic electroluminescent (light-emitting) layers, are deposited on a substrate in a vacuum evaporation chamber by evaporation of an organic material from an evaporation source [c. 8, l. 55 - c. 9, l. 19]. No limitations are placed on the vacuum deposition process other than that it is preferably carried out in a direction vertical to a surface of the substrate [c. 9, ll. 14 - 16].

Mizutani et al. do not teach that the evaporation source has an elongated shape extending along a first direction or

repeatedly moving the relative position of the evaporation source with respect to the substrate along a second direction during the step of evaporating the material in order that a same portion of the substrate is coated with the organic material at least twice.

As noted above, Grothe et al. teach that, when coating a substrate by vapor deposition, an evaporation source elongated in one dimension results in enhanced vapor density and deposition uniformity over the entire width of the substrate [c. 5, ll. 40 - 50 and 60 - 63]. It is the examiner's position that the source of Grothe et al. reads on a source having "an elongated shape extending along a first direction."

It would have been obvious to one of ordinary skill in the art to modify the method of Mizutani et al. so as to utilize, as the evaporation source, a source having an elongated shape extending along a first direction, as suggested by Grothe et al. One would have been motivated to do so by the desire and expectation of improving vapor density and deposition uniformity.

Bennett teaches that, in a vacuum vapor deposition process, moving the evaporation source with respect to the substrate improves deposition speed and uniformity.

It would have been further obvious to one of ordinary skill in the art to modify the method of Mizutani et al. so as to move the evaporation source relative to the substrate, as suggested by Bennett. One of ordinary skill in the art would have been motivated to do so by the desire and expectation of improving deposition speed and uniformity.

None of the cited references teach coating the same portion of substrate twice. It is, nevertheless, well-known in the art of coating substrates to repeat a coating step the number of times required to build-up a coating of a desired thickness. Consequently, it would have been obvious to do so.

If applicant's first direction is interpreted as being the same as the second direction, no further explanation is necessary. If, in the alternative, the first direction is not the same as the second, it would have been obvious to one of ordinary skill in the art to optimize the orientation of the source with respect to the direction of motion so as to achieve the greatest efficiency and uniformity of coating. In particular, an orientation in which the direction of elongation of the source is perpendicular to the direction of motion allows coating the widest swath of substrate possible with each pass of the coating source.

With respect to claims 29 and 51, none of the cited references teach a step of cleaning the inside of the evaporation chamber. It is the examiner's position, however, that cleaning the inside of a deposition chamber is a well-known means of eliminating contaminants in the chamber. Consequently, it would have been obvious to one of ordinary skill in the art to do so. Further, plasma is a chamber-cleaning expedient that is well-known in the art.

With respect to claim 33, Mizutani et al. further teach depositing through a mask, the mask being held in place against the substrate by an electromagnet [c. 5, ll. 52 - 57; c. 5, l. 65 - c. 6, l. 6].

With respect to claim 34, none of the references teach that the substrate is located between the electromagnet and the shadow mask. Nevertheless, it would have been obvious to utilize such an arrangement as the mask does obstruct the flow of coating material from the coating source.

With respect to claim 50, the length of the evaporation source is a result-effective variable effecting the efficiency of the coating process. In other words, the smaller (shorter)

the source, the longer it takes to coat the substrate. A source that is too large (long) may be wasteful of evaporation material and too costly. Absent a showing of unexpected results demonstrating the criticality of the claimed range of source length, it would have been obvious to one of ordinary skill in the art to optimize this result-effective variable by routine experimentation.

With respect to claim 52, none of the cited references teach coating the same portion of substrate twice. It is, nevertheless, well-known in the art of coating substrates to repeat a coating step the number of times required to build-up a coating of a desired thickness. Consequently, it would have been obvious to do so.

(4) Claims 24, 30, 43, 46, 47, and 51 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Mizutani et al. {US 6,326,726 B1}, in view of Grothe et al. {US 3,391,490}, Bennett {US 2,435,997}, and Monk {US 4,187,801}.

The combined teaching of Mizutani et al., Grothe et al., and Bennett is described above. None of these references teach

that the evaporation source is longer than at least one edge of the substrate.

Monk teaches that, in a vapor deposition method, it is conventional to treat a larger area than covered by the sample to avoid edge effects [c. 1, ll. 17 - 20].

Consequently, it would have been obvious to one of ordinary skill in the art to modify the method of Mizutani et al., Grothe et al., and Bennett, so as to utilize an elongated source that is longer than at least one edge of the substrate. One of ordinary skill in the art would have been motivated to do so by the desire and expectation of avoiding edge effects, as suggested by Monk.

If applicant's first direction is interpreted as being the same as the second direction, no further explanation is necessary. If, in the alternative, the first direction is not the same as the second, it would have been obvious to one of ordinary skill in the art to optimize the orientation of the source with respect to the direction of motion so as to achieve the greatest efficiency and uniformity of coating. In particular, an orientation in which the direction of elongation of the source is perpendicular to the direction of motion allows coating the widest swath of substrate possible with each pass of the coating source.

With respect to claims 30 and 51, none of the cited references teach a step of cleaning the inside of the evaporation chamber. It is the examiner's position, however, that cleaning the inside of a deposition chamber is a well-known means of eliminating contaminants in the chamber. Consequently, it would have been obvious to one of ordinary skill in the art to do so. Further, plasma is a chamber-cleaning expedient that is well-known in the art.

(5) Claims 26, 31, 35, 43, 46, 47, 51, and 52 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Mizutani et al. {US 6,326,726 B1}, in view of Feuerstein et al. {US 4,627,989} and Bennett {US 2,435,997}.

The teaching of Mizutani et al. is described above, as is the teaching of Bennett. Neither of these references disclose an evaporation source comprising a plurality of evaporation cells arranged along a first direction.

Feuerstein et al. teach a method of coating a substrate utilizing a vacuum evaporator comprising an elongated array of individually controllable vapor sources [c. 1, ll. 21 - 24; c. 2, ll. 40 - 45; c. 4, ll. 55 - 57; and c. 6, ll. 18 - 26]. Such

a source facilitates greater control over deposition thickness and uniformity [c. 2, ll. 41 - 45].

It would have been obvious to one of ordinary skill in the art to modify the process of Mizutani et al. so as to utilize an evaporation source comprising a plurality of evaporation cells arranged along a first direction so as to achieve greater control over deposition thickness and uniformity, as suggested by Feuerstein et al.

It would have been further obvious to move the relative position of this source with respect to the substrate during evaporation. Bennett teaches that moving the source with respect to the substrate improves deposition speed and uniformity [see above]. Specifically moving the source instead of the substrate is considered advantageous because it requires a smaller vacuum chamber [c. 3, l. 72 - c. 4, l. 3].

If applicant's first direction is interpreted as being the same as the second direction, no further explanation is necessary. If, in the alternative, the first direction is not the same as the second, it would have been obvious to one of ordinary skill in the art to optimize the orientation of the source with respect to the direction of motion so as to achieve the greatest efficiency and uniformity of coating. In particular, an orientation in which the direction of elongation

of the source is perpendicular to the direction of motion allows coating the widest swath of substrate possible with each pass of the coating source.

With respect to claims 31 and 51, none of the cited references teach a step of cleaning the inside of the evaporation chamber. It is the examiner's position, however, that cleaning the inside of a deposition chamber is a well-known means of eliminating contaminants in the chamber. Consequently, it would have been obvious to one of ordinary skill in the art to do so. Further, plasma is a chamber-cleaning expedient that is well-known in the art.

With respect to claim 35, Mizutani et al. further teach depositing through a mask, the mask being held in place against the substrate by an electromagnet [c. 5, ll. 52 - 57; c. 5, l. 65 - c. 6, l. 6]. None of the references teach that the substrate is located between the electromagnet and the shadow mask. Nevertheless, it would have been obvious to utilize such an arrangement as the mask does obstruct the flow of coating material from the coating source.

With respect to claim 52, none of the cited references teach coating the same portion of substrate twice. It is, nevertheless, well-known in the art of coating substrates to repeat a coating step the number of times required to build-up a coating of a desired thickness. Consequently, it would have been obvious to do so.

(6) Claims 27, 28, 32, 36, 43, 46, 47, and 51 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Mizutani et al. {US 6,326,726 B1}, in view of Feuerstein et al. {US 4,627,989} and Bennett {US 2,435,997} or, in the alternative, over Mizutani et al., in view of Feuerstein et al., Bennett, and Monk {US 4,187,801}.

With respect to claim 27, the combined teaching of Mizutani et al., Feuerstein et al., and Bennett is described in rejection **(5)** above. Additionally, Feuerstein et al. illustrate, but do not require, a source that is longer than at least one edge of the substrate [Fig. 1]. Nevertheless, it would have been obvious to utilize a source longer than at least one edge of the substrate to avoid edge effects, as taught by Monk [see rejection **(4)** above].

If applicant's first direction is interpreted as being the same as the second direction, no further explanation is necessary. If, in the alternative, the first direction is not the same as the second, it would have been obvious to one of ordinary skill in the art to optimize the orientation of the source with respect to the direction of motion so as to achieve the greatest efficiency and uniformity of coating. In particular, an orientation in which the direction of elongation of the source is perpendicular to the direction of motion allows coating the widest swath of substrate possible with each pass of the coating source.

With respect to claim 28, none of the cited references teach coating the same portion of substrate twice. It is, nevertheless, well-known in the art of coating substrates to repeat a coating step the number of times required to build-up a coating of a desired thickness. Consequently, it would have been obvious to do so.

With respect to claim 32 and 51, none of the cited references teach a step of cleaning the inside of the evaporation chamber. It is the examiner's position, however, that cleaning the inside of a deposition chamber is a well-known

means of eliminating contaminants in the chamber. Consequently, it would have been obvious to one of ordinary skill in the art to do so. Further, plasma is a chamber-cleaning expedient that is well-known in the art.

With respect to claim 36, Mizutani et al. further teach depositing through a mask, the mask being held in place against the substrate by an electromagnet [c. 5, ll. 52 - 57; c. 5, l. 65 - c. 6, l. 6]. None of the references teach that the substrate is located between the electromagnet and the shadow mask. Nevertheless, it would have been obvious to utilize such an arrangement as the mask does obstruct the flow of coating material from the coating source.

(7) Claim 37, 43, 48, and 53 is rejected under 35 U.S.C. § 103(a) as being unpatentable over Arai et al. {US 5,817,366}, in view of Bennett {US 2,435,997} and Grothe et al. {US 3,931,490}.

The teaching of Arai et al. is described in rejection **(2)** above. Arai et al. do not place any limitations on the vapor deposition processes carried-out in the chambers.

Arai et al. do not teach that first and second evaporation sources have an elongated shape extending in a first direction

or that the relative positions of the sources are moved with respect to the substrate are moved during deposition.

Grothe et al. teach that, when coating a substrate by vapor deposition, an evaporation source elongated in one dimension results in enhanced vapor density and deposition uniformity over the entire width of the substrate [c. 5, ll. 40 - 50 and 60 - 63]. It is the examiner's position that the source of Grothe et al. reads on a source having "an elongated shape."

It would have been obvious to one of ordinary skill in the art to modify the process of Arai et al., so as to utilize an evaporation source elongated in one dimension, as suggested by Grothe et al. One of ordinary skill in the art would have been motivated to do so by the desire and expectation of achieving enhanced vapor density and deposition uniformity, as suggested by Grothe et al.

Bennett teaches that, in a vacuum vapor deposition process, moving the evaporation source with respect to the substrate improves deposition speed and uniformity.

It would have been further obvious to one of ordinary skill in the art to modify the method of Mizutani et al. so as to move the evaporation source relative to the substrate, as suggested by Bennett. One of ordinary skill in the art would have been

motivated to do so by the desire and expectation of improving deposition speed and uniformity.

If applicant's first direction is interpreted as being the same as the second direction, no further explanation is necessary. If, in the alternative, the first direction is not the same as the second, it would have been obvious to one of ordinary skill in the art to optimize the orientation of the source with respect to the direction of motion so as to achieve the greatest efficiency and uniformity of coating. In particular, an orientation in which the direction of elongation of the source is perpendicular to the direction of motion allows coating the widest swath of substrate possible with each pass of the coating source.

With respect to claim 53, none of the cited references teach coating the same portion of substrate twice. It is, nevertheless, well-known in the art of coating substrates to repeat a coating step the number of times required to build-up a coating of a desired thickness. Consequently, it would have been obvious to do so.

(8) Claim 38, 43, and 48 is rejected under 35 U.S.C. § 103(a) as being unpatentable over Arai et al. {US 5,817,366}, in view

of Bennett {US 2,435,997}, Grothe et al. {US 3,931,490}, and Monk {US 4,187,801}.

The combined teaching of Arai et al., Bennett, and Grothe et al. are described in rejection **(9)** above. None of the references teach that the evaporation sources are longer than at least one edge of the substrate.

Monk teaches that, in a vapor deposition method, it is conventional to treat a larger area than covered by the sample to avoid edge effects [c. 1, ll. 17 - 20].

Consequently, it would have been obvious to one of ordinary skill in the art to modify the method of Mizutani et al., Grothe et al., and Bennett, so as to utilize an elongated source that is longer than at least one edge of the substrate. One of ordinary skill in the art would have been motivated to do so by the desire and expectation of avoiding edge effects, as suggested by Monk.

If applicant's first direction is interpreted as being the same as the second direction, no further explanation is necessary. If, in the alternative, the first direction is not the same as the second, it would have been obvious to one of ordinary skill in the art to optimize the orientation of the source with respect to the direction of motion so as to achieve

the greatest efficiency and uniformity of coating. In particular, an orientation in which the direction of elongation of the source is perpendicular to the direction of motion allows coating the widest swath of substrate possible with each pass of the coating source.

(9) Claim 39, 43, 48, and 53 is rejected under 35 U.S.C. § 103(a) as being unpatentable over Arai et al. {US 5,817,366}, in view of Feuerstein et al. {US 4,627,989}, Bennett {US 2,435,997}.

The teaching of Arai et al. is described in rejection **(2)** above. Arai et al. do not place any limitations on the vapor deposition processes carried-out in the chambers.

Arai et al. do not teach that first and second evaporation sources comprise a plurality of evaporation cells arranged along a first direction or that the relative positions of the sources are moved with respect to the substrate during deposition.

Feuerstein et al. teach a method of coating a substrate utilizing a vacuum evaporator comprising an elongated array of individually controllable vapor sources [c. 1, ll. 21 - 24; c. 2, ll. 40 - 45; c. 4, ll. 55 - 57; and c. 6, ll. 18 - 26]. Such

a source facilitates greater control over deposition thickness and uniformity [c. 2, ll. 41 - 45].

It would have been obvious to one of ordinary skill in the art to modify the process of Arai et al. so as to utilize an evaporation source comprising a plurality of evaporation cells arranged along a first direction so as to achieve greater control over deposition thickness and uniformity, as suggested by Feuerstein et al.

It would have been further obvious to move the relative position of this source with respect to the substrate during evaporation. Bennett teaches that moving the source with respect to the substrate improves deposition speed and uniformity [see above]. Specifically moving the source instead of the substrate is considered advantageous because it requires a smaller vacuum chamber [c. 3, l. 72 - c. 4, l. 3].

If applicant's first direction is interpreted as being the same as the second direction, no further explanation is necessary. If, in the alternative, the first direction is not the same as the second, it would have been obvious to one of ordinary skill in the art to optimize the orientation of the source with respect to the direction of motion so as to achieve the greatest efficiency and uniformity of coating. In particular, an orientation in which the direction of elongation

of the source is perpendicular to the direction of motion allows coating the widest swath of substrate possible with each pass of the coating source.

With respect to claim 53, None of the cited references teach coating the same portion of substrate twice. It is, nevertheless, well-known in the art of coating substrates to repeat a coating step the number of times required to build-up a coating of a desired thickness. Consequently, it would have been obvious to do so.

(10) Claim 40, 43, and 48 is rejected under 35 U.S.C. § 103(a) as being unpatentable over Arai et al. {US 5,817,366}, in view of Feuerstein et al. {US 4,627,989} and Bennett {US 2,435,997} or, in the alternative, over Arai et al., in view of Feuerstein et al., Bennett, and Monk {US 4,187,801}.

The combined teaching of Arai et al., Feuerstein et al., and Bennett is described in rejection **(9)** above. Additionally, Feuerstein et al. illustrate, but do not require, a source that is longer than at least one edge of the substrate [Fig. 1]. Nevertheless, it would have been obvious to utilize a source

longer than at least one edge of the substrate to avoid edge effects, as taught by Monk [see rejection **(4)** above].

If applicant's first direction is interpreted as being the same as the second direction, no further explanation is necessary. If, in the alternative, the first direction is not the same as the second, it would have been obvious to one of ordinary skill in the art to optimize the orientation of the source with respect to the direction of motion so as to achieve the greatest efficiency and uniformity of coating. In particular, an orientation in which the direction of elongation of the source is perpendicular to the direction of motion allows coating the widest swath of substrate possible with each pass of the coating source.

(11) Claims 41, 42, 46, and 47 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Mizutani et al. {US 6,326,726 B1} in view of Bennett {US 2,435,997}.

With respect to claim 41, the teaching of Mizutani et al. is described above. Mizutani et al. do not teach repeatedly moving the relative position of the evaporation source with respect to the substrate in order that a same portion of the substrate is coated with the material at least twice.

Bennett teaches that, in a vacuum vapor deposition process, moving the evaporation source with respect to the substrate improves deposition speed and uniformity.

It would have been obvious to one of ordinary skill in the art to modify the method of Mizutani et al. so as to move the evaporation source relative to the substrate, as suggested by Bennett. One of ordinary skill in the art would have been motivated to do so by the desire and expectation of improving deposition speed and uniformity.

None of the cited references teach coating the same portion of substrate twice. It is, nevertheless, well-known in the art of coating substrates to repeat a coating step the number of times required to build-up a coating of a desired thickness. Consequently, it would have been obvious to do so.

With respect to claim 42, the teaching of Mizutani et al. is described above. Mizutani et al. do not teach repeatedly moving the relative position of the evaporation source with respect to the substrate in order that a same portion of the substrate is coated with the material at least twice.

Bennett teaches that, in a vacuum vapor deposition process, moving the evaporation source with respect to the substrate improves deposition speed and uniformity.

It would have been obvious to one of ordinary skill in the art to modify the method of Mizutani et al. so as to move the evaporation source relative to the substrate, as suggested by Bennett. One of ordinary skill in the art would have been motivated to do so by the desire and expectation of improving deposition speed and uniformity.

None of the cited references teach cleaning the inside of the deposition chambers. It is the examiner's position, however, that cleaning the inside of a deposition chamber is a well-known means of eliminating contaminants in the chamber. Consequently, it would have been obvious to one of ordinary skill in the art to do so.

(12) Claim 49 is rejected under 35 U.S.C. § 103(a) as being unpatentable over Arai et al. {US 5,817,366} in view of Grothe et al. {US 3,391,490} and Monk {US 4,187,801}, as applied to claim 20 above; or over Mizutani et al. {US 6,326,726 B1}, in view of Grothe et al. {US 3,391,490} and Bennett {US 2,435,997}, as applied to claims 23, 25, 29, and 33 above; or over Mizutani et al. {US 6,326,726 B1}, in view of Grothe et al. {US 3,391,490}, Bennett {US 2,435,997}, and Monk {US 4,187,801}, as applied to claims 24 and 30 above; or over Mizutani et al. {US 6,326,726 B1}, in view of Feuerstein et al. {US 4,627,989} and

Bennett {US 2,435,997}, as applied to claims 26, 31, and 35 above; or over Mizutani et al. {US 6,326,726 B1}, in view of Feuerstein et al. {US 4,627,989} and Bennett {US 2,435,997} or, in the alternative, over Mizutani et al., in view of Feuerstein et al., Bennett, and Monk {US 4,187,801}, as applied to claims 27, 28, 32, and 36 above; or over Arai et al. {US 5,817,366}, in view of Bennett {US 2,435,997} and Grothe et al. US 3,931,490}, as applied to claim 37 above; or over Arai et al. {US 5,817,366}, in view of Bennett {US 2,435,997}, Grothe et al. US 3,931,490}, and Monk {US 4,187,801}, as applied to claim 38 above; or Arai et al. {US 5,817,366}, in view of Feuerstein et al. {US 4,627,989}, Bennett {US 2,435,997}, as applied to claim 39 above; or over Arai et al. {US 5,817,366}, in view of Feuerstein et al. {US 4,627,989} and Bennett {US 2,435,997} or, in the alternative, over Arai et al., in view of Feuerstein et al., Bennett, and Monk {US 4,187,801}, as applied to claim 40 above; or over Mizutani et al. {US 6,326,726 B1} in view of Bennett {US 2,435,997}, as applied to claims 41 and 42 above, each in view of Spitzer et al. {US 5,258,325}.

The teachings of all of the cited references are described above. None of these teach that the display device is an active matrix electroluminescence display device.

Spitzer et al. teach that it is the electrode arrangement that distinguishes an active matrix device. Consequently, it is the examiner's position that it would have been obvious to utilize the above-cited methods of depositing organic electroluminescent material to manufacture an active matrix electroluminescent display device. One of ordinary skill in the art would have been motivated by the expectation of successfully manufacturing an active matrix EL display device since the deposition of the organic EL material does not determine whether or not the matrix is active.

VII. Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL.** See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened

statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to William P. Fletcher III whose telephone number is (703) 308-7956. The examiner can normally be reached on Monday through Friday, 9 AM to 5 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Shrive P. Beck can be reached on (703) 308-2333. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9310 for regular communications and (703) 872-9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0661.

William Phillip Fletcher III
Patent Examiner
United States Patent & Trademark Office
Group Art Unit 1762

wpf
December 13, 2002

SHRIVE P. BECK
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 1700